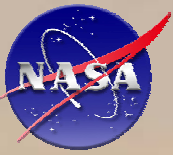


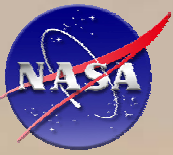
Robotic Access to Planetary Surfaces

“Land, Fly, Rove, Dig”



Scope

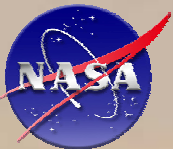
- **Sub-orbital operations at large bodies**
 - **Land, fly, rove, dig**
 - **Moon, Mars, Venus, Titan, Europa, etc.**
 - **Also Earth entry and landing**
- **Roadmap technologies, facilities, flight tests, mission experience**



Why

- **Enable the next generation of robotic surface missions**
 - **Some examples:**
 - **Mars in situ laboratories**
 - **Venus and Titan aerobots**
 - **Europa pathfinder lander**
 - **Sample return missions**
 - **Many others ...**





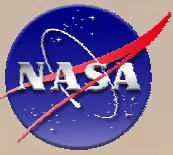
Core Team

- **Mark Adler (co-chair) - JPL**
- **Bobby Braun (co-chair) - Georgia Tech**
- **Samad Hayati (dep chair) - JPL**
- **Carl Ruoff (APIO) - JPL**
- **Ben Clark - Lockheed-Martin**
- **Debora Fairbrother - GSFC**
- **Steve Gorevan - Honeybee Robotics**
- **Claude Graves - JSC**
- **Dean Kontinos - ARC**
- **Dave Miller - MIT**
- **Joe Parrish - Payload Systems**
- **Tom Rivellini - JPL**
- **Henry Wright - LaRC**
- **Brian Wilcox - JPL**
- **Al Witkowski - Pioneer Aerospace**



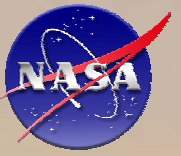
Capabilities (1)

- **Surface access**
 - **Mobility**
 - **Difficult terrain, high rate**
 - **Longevity**
 - **Extreme environments**
- **Surface Material Access**
 - **Sample access**
 - **Drilling, coring, melting, transfer, dexterity**
 - **Contamination control**



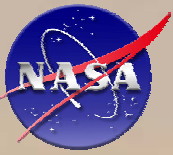
Capabilities (2)

- **Entry, Descent, and Landing**
 - **Atmospheric entry and aerocapture**
 - **Thermal protection systems**
 - **Entry vehicle configurations**
 - **Hypersonic guidance**
 - **Parachute decelerators**
 - **Multi-stage, High-mach, Steerable**
 - **Terminal descent systems**
 - **Sensors, propulsion, energy absorption**
 - **Orbital precursor observations**



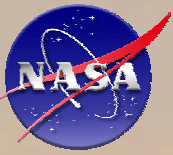
Capabilities (3)

- **Aerial systems**
 - **Gliders**
 - **Planes**
 - **Balloons, dirigibles**
 - **VTOL**
 - **Guidance and control**
 - **Deployment**



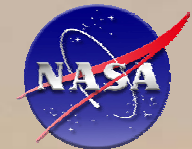
Process

- **Canvas community for ideas**
 - **That's today!**
- **Conduct workshops with invited advocates**
- **Interact with related roadmaps**
- **Produce roadmap document**



Status

- **Scope defined**
- **Core team formed**
- **First workshop scheduled**

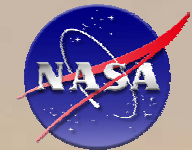


Contact

Mark Adler

mark.adler@quest.jpl.nasa.gov

818 354-MARS



Questions?